Econometric Modeler Analysis

Summary of results from the Econometric Modeler App

Econometrics Toolbox Version 5.6 (R2021a)

29-May-2024

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1. ARIMA(4,1,4) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp1)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1 - \phi_1 L - ... - \phi_4 L^4)(1 - \Phi_{12} L^{12})(1 - L)(1 - L^{12}) y_t \ = \ c \ + \ (1 + \theta_1 L - ... - \theta_4 L^4)(1 + \Theta_{12} L^{12}) \varepsilon_t$

1.1. Model Estimation

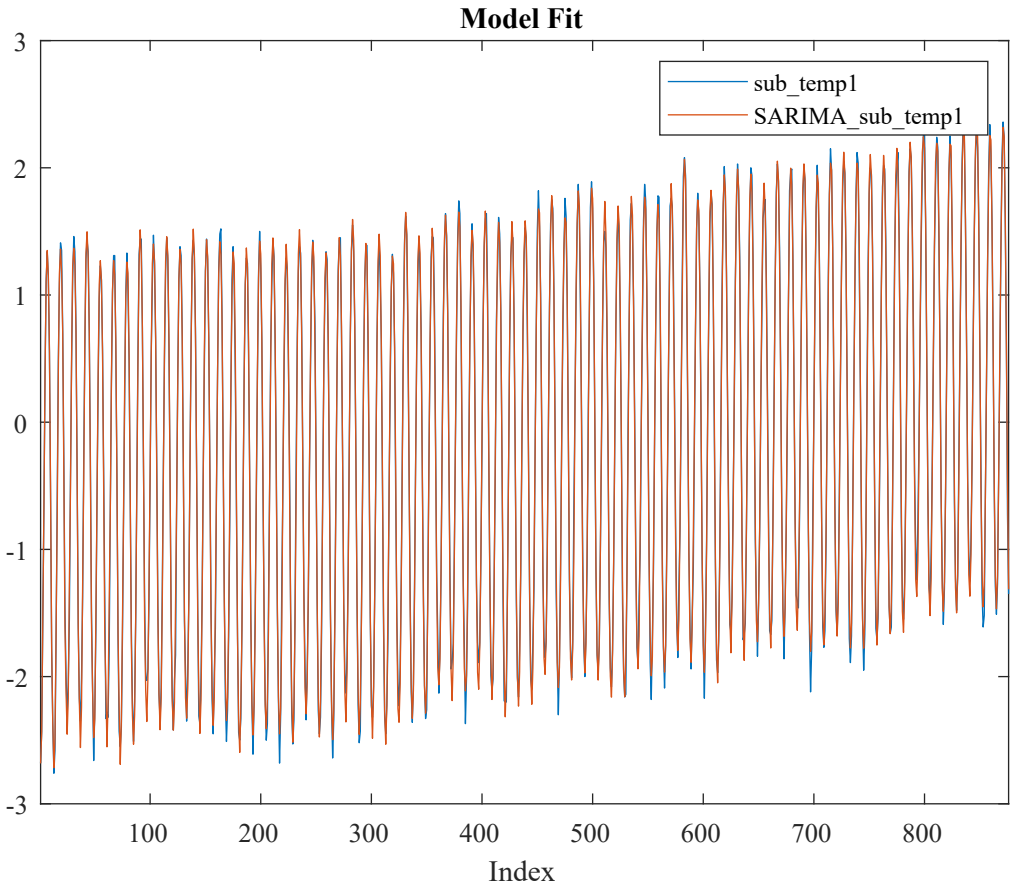
Tabel 1.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Constant	7.2091e-06	3.6039e-06	2.0003	0.045464
AR{1}	0.42206	0.31896	1.3232	0.18575
AR{2}	0.14154	0.28021	0.50513	0.61346
AR{3}	-0.023556	0.12537	-0.18789	0.85096
AR{4}	0.16144	0.089476	1.8043	0.07118
SAR{12}	-0.080241	0.032839	-2.4435	0.014546
MA{1}	-0.96835	0.3181	-3.0441	0.0023336
MA{2}	0.10269	0.45062	0.2279	0.81973
MA{3}	-0.056509	0.15611	-0.36199	0.71736
MA{4}	-0.077838	0.12329	-0.63133	0.52783
SMA{12}	-0.86787	0.017	-51.0502	0
Variance	0.011456	0.00050826	22.5404	1.6683e-112

Tabel 1.2. Goodness of Fit

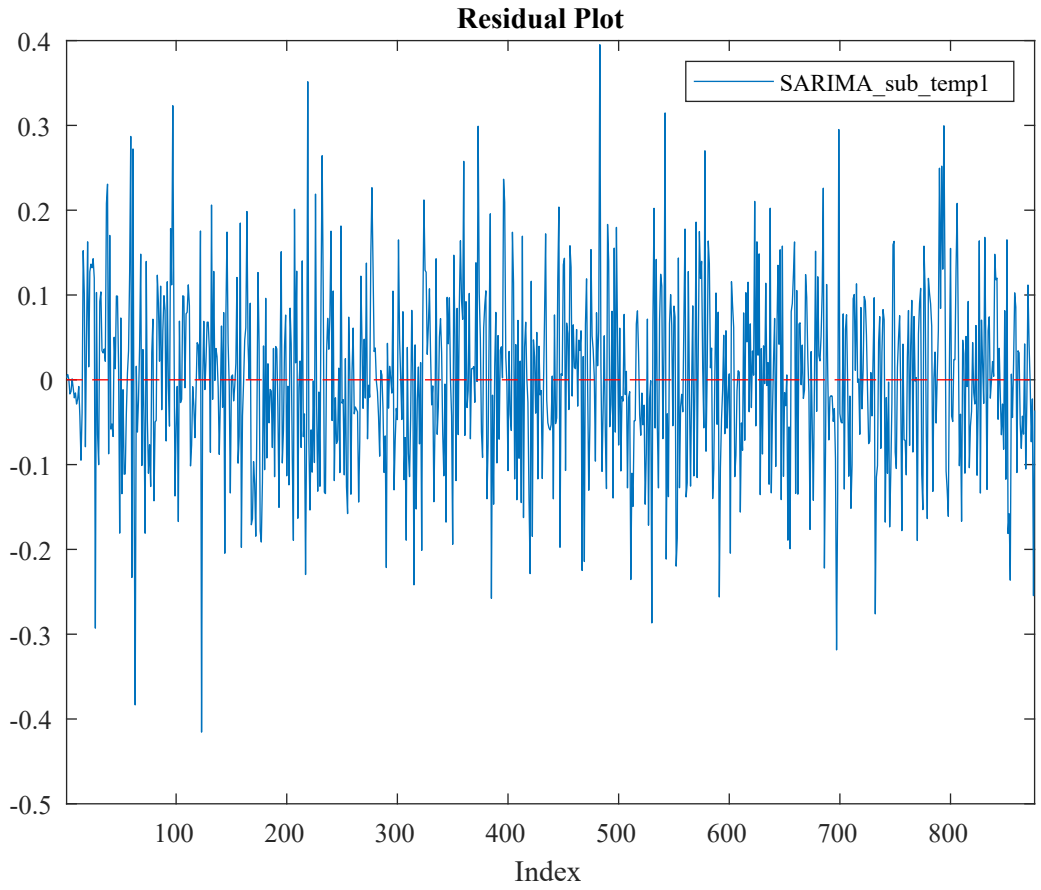
AIC	-1405.0541
BIC	-1348.1536

1. ARIMA(4,1,4) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp1)



Figuur 1.1. Plot the fit of model SARIMA_sub_temp1 time series sub_temp1

1. ARIMA(4,1,4) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp1)



Figuur 1.2. Plot of the residuals of model SARIMA_sub_temp1

2. ARIMA(3,1,3) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp12)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1 - \phi_1 L - \phi_2 L^2 - \phi_3 L^3)(1 - \Phi_{12} L^{12})(1 - L)(1 - L^{12}) y_t \ = \ c \ + \ (1 + \theta_1 L + \theta_2 L^2 + \theta_3 L^3)(1 + \Theta_{12} L^{12}) \varepsilon_t$

2.1. Model Estimation

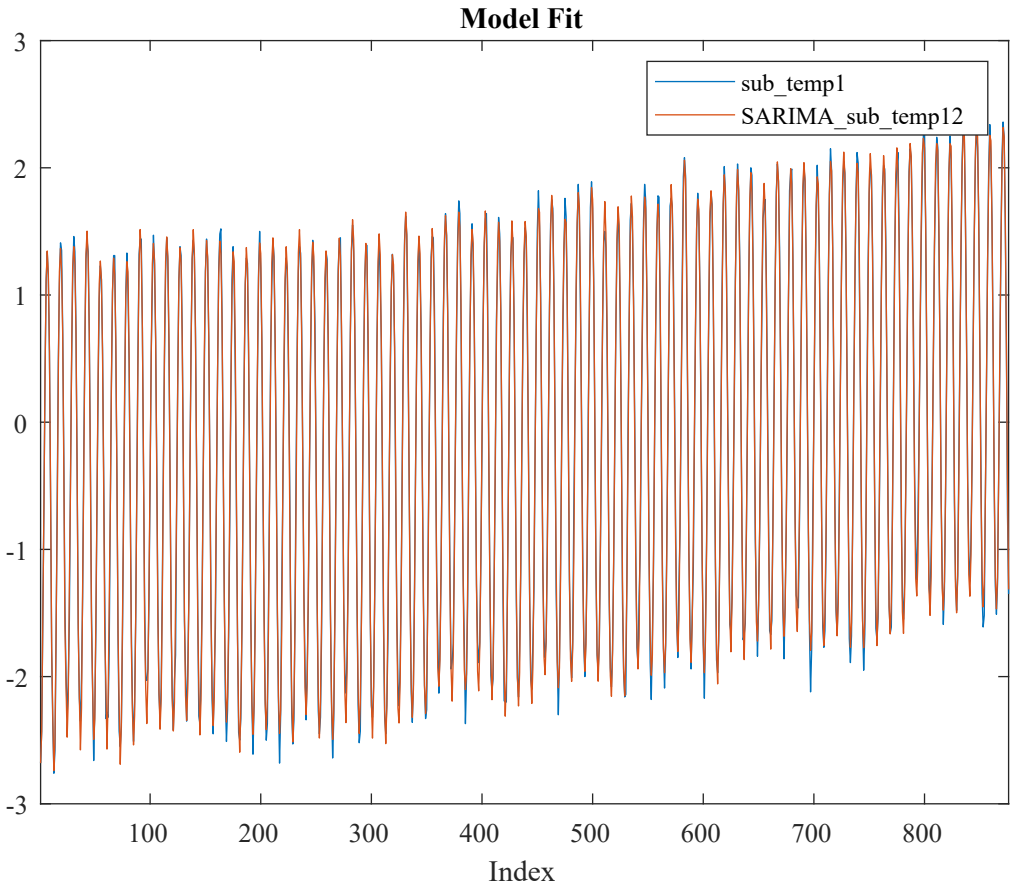
Tabel 2.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Constant	8.2738e-06	3.821e-06	2.1654	0.030361
AR{1}	-0.11292	0.16258	-0.69451	0.48736
AR{2}	0.67311	0.11828	5.6908	1.2645e-08
AR{3}	0.086975	0.053794	1.6168	0.10592
SAR{12}	-0.047937	0.031963	-1.4998	0.13368
MA{1}	-0.44417	0.16794	-2.6449	0.0081718
MA{2}	-0.71168	0.20586	-3.4572	0.00054592
MA{3}	0.15586	0.085193	1.8294	0.067333
SMA{12}	-0.87345	0.01658	-52.6803	0
Variance	0.011532	0.00051141	22.5502	1.3366e-112

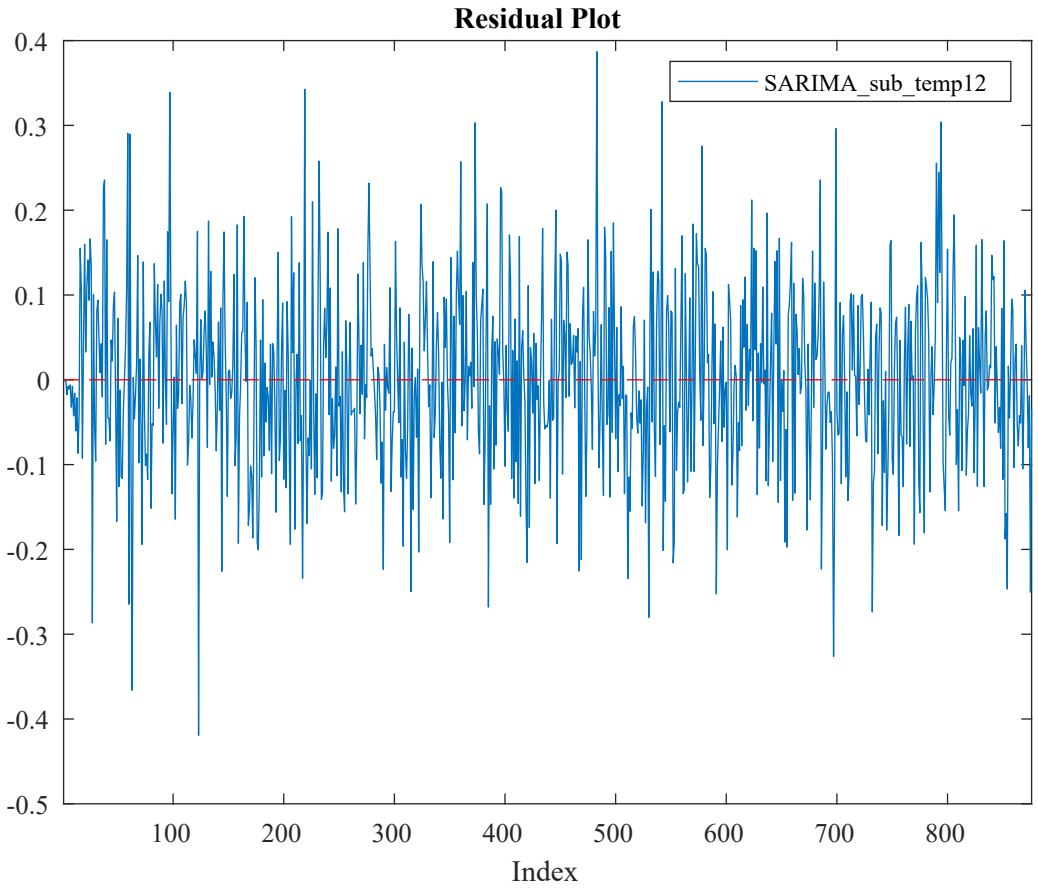
Tabel 2.2. Goodness of Fit

AIC	-1403.2679
BIC	-1355.8391

2. ARIMA(3,1,3) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp12)



Figuur 2.1. Plot the fit of model SARIMA_sub_temp12 time series sub_temp1



Figuur 2.2. Plot of the residuals of model SARIMA_sub_temp12

3. ARIMA(2,1,2) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp13)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1 - \phi_1 L - \phi_2 L^2)(1 - \Phi_{12} L^{12})(1 - L)(1 - L^{12}) y_t \ = \ c \ + \ (1 + \theta_1 L + \theta_2 L^2)(1 + \Theta_{12} L^{12}) \varepsilon_t$

3.1. Model Estimation

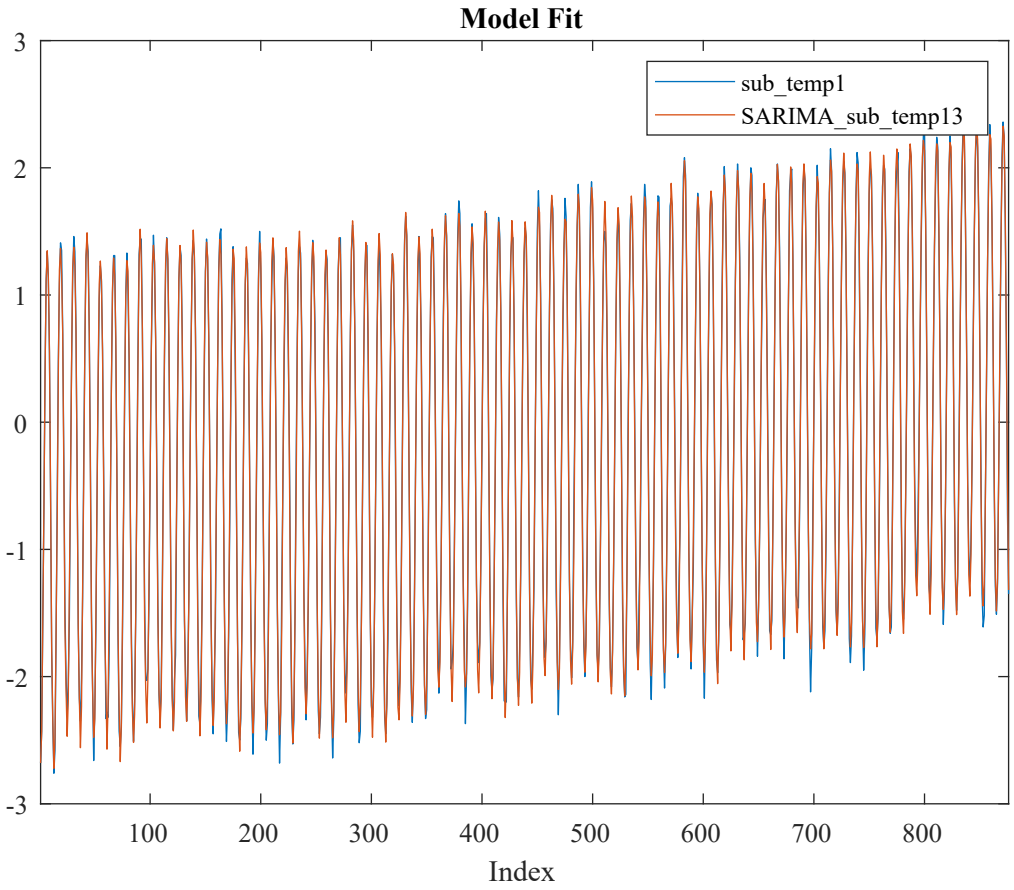
Tabel 3.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Constant	7.4334e-06	2.91e-06	2.5544	0.010637
AR{1}	0.27861	0.084606	3.2931	0.00099103
AR{2}	0.36849	0.055952	6.5858	4.5231e-11
SAR{12}	0.01834	0.023178	0.79127	0.42879
MA{1}	-0.82183	0.096019	-8.559	1.1387e-17
MA{2}	-0.17817	0.095304	-1.8695	0.06155
SMA{12}	-0.89344	0.015351	-58.2021	0
Variance	0.011667	0.00050771	22.9795	7.471e-117

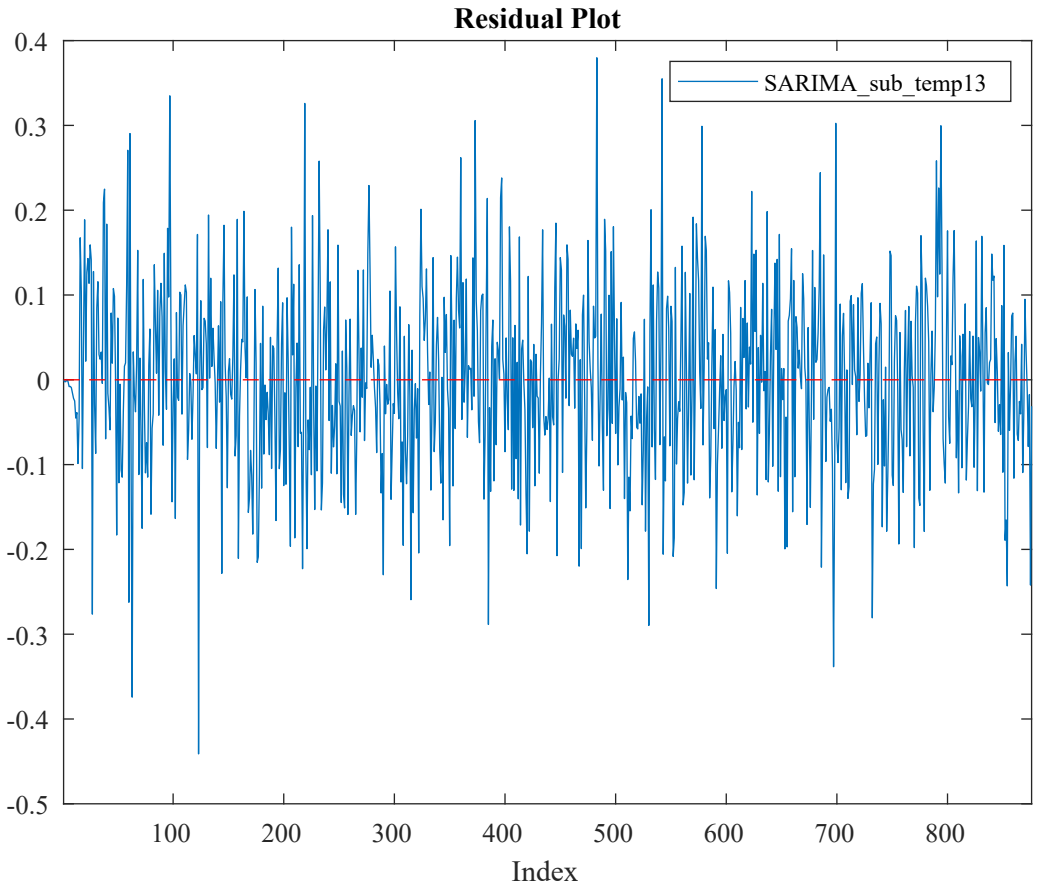
Tabel 3.2. Goodness of Fit

AIC	-1397.0878
BIC	-1359.1353

3. ARIMA(2,1,2) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp13)



Figuur 3.1. Plot the fit of model SARIMA_sub_temp13 time series sub_temp1



Figuur 3.2. Plot of the residuals of model SARIMA_sub_temp13

4. ARIMA(1,1,1) Model Seasonally Integrated with Seasonal AR(12) and MA(12) (Gaussian Distribution) (SARIMA_sub_temp14)

Seasonal ARIMA model of time series sub_temp1 with the following equation:

$$(1 - \phi_1 L)(1 - \Phi_{12} L^{12})(1 - L)(1 - L^{12}) y_t \;=\; c \;+\; (1 + \theta_1 L)(1 + \Theta_{12} L^{12}) \varepsilon_t$$

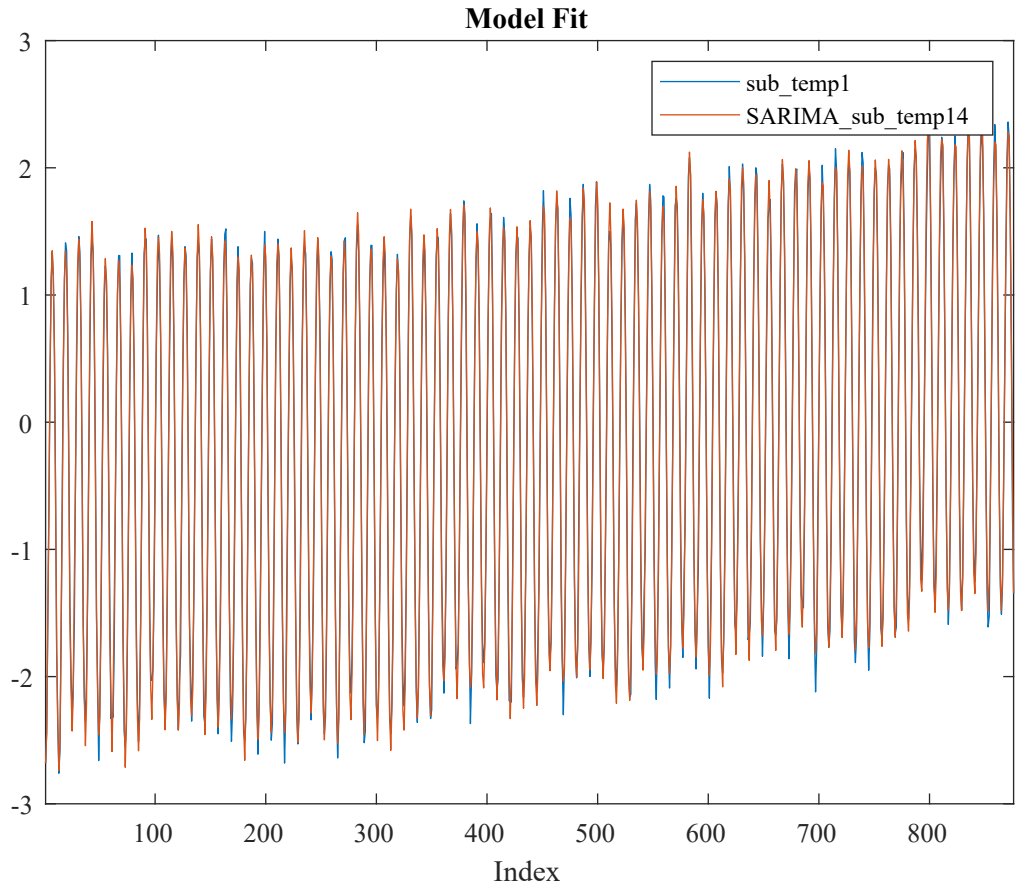
4.1. Model Estimation

Tabel 4.1. Estimation Results

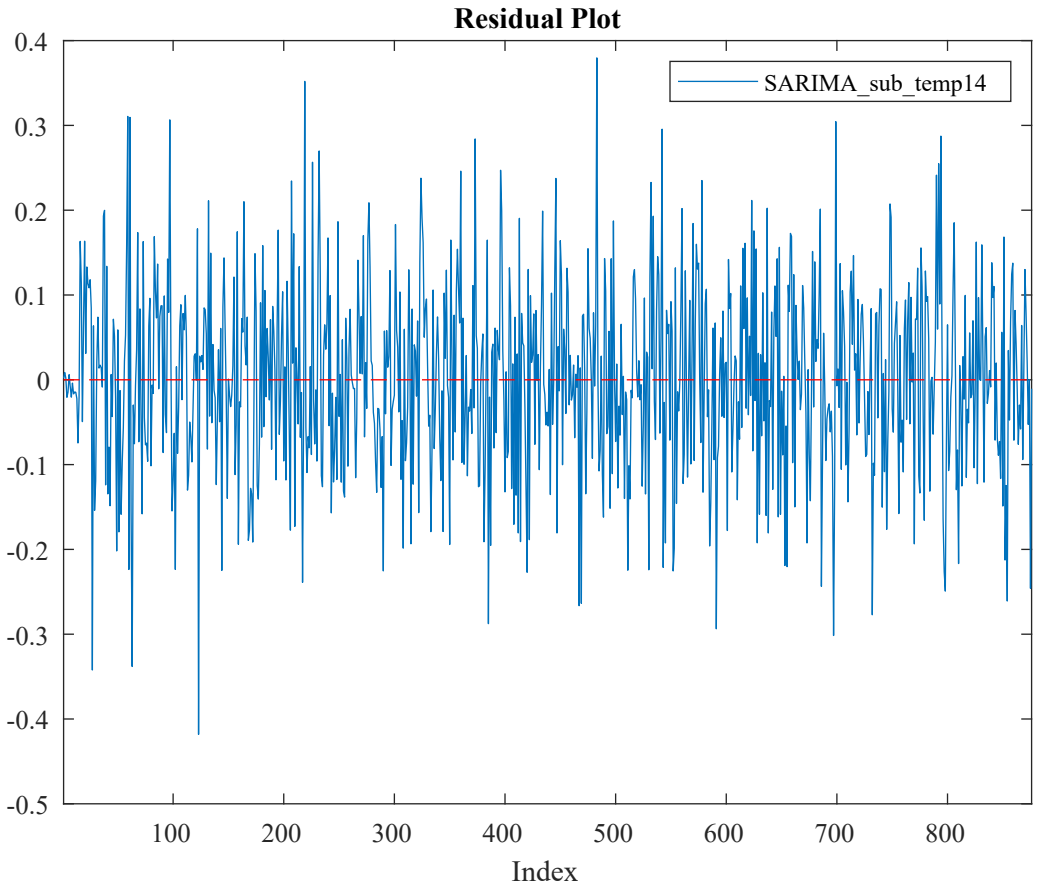
Parameter	Value	Standard Error	t Statistic	P-Value
Constant	-3.7704e-06	0.00021431	-0.017593	0.98596
AR{1}	0.12731	0.060373	2.1087	0.034972
SAR{12}	-0.11272	0.033007	-3.415	0.00063782
MA{1}	-0.6214	0.047247	-13.1522	1.6528e-39
SMA{12}	-0.86274	0.017077	-50.5205	0
Variance	0.012278	0.00055136	22.2688	7.409e-110

Tabel 4.2. Goodness of Fit

AIC	-1356.3585
BIC	-1327.8871



Figuur 4.1. Plot the fit of model SARIMA_sub_temp14 time series sub_temp1



Figuur 4.2. Plot of the residuals of model SARIMA_sub_temp14

5. ARIMA(4,1,4) Model Seasonally Integrated with Seasonal AR(24) and MA(24) (Gaussian Distribution) (SARIMA_sub_temp15)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1 - \phi_1 L - ... - \phi_4 L^4)(1 - \Phi_{12} L^{12} - \Phi_{24} L^{24})(1 - L)(1 - L^{12}) y_t \ = \ c \ + \ (1 + \theta_1 L - ... - \theta_4 L^4)(1 + \Theta_{12} L^{12} + \Theta_{24} L^{24}) \varepsilon_t$

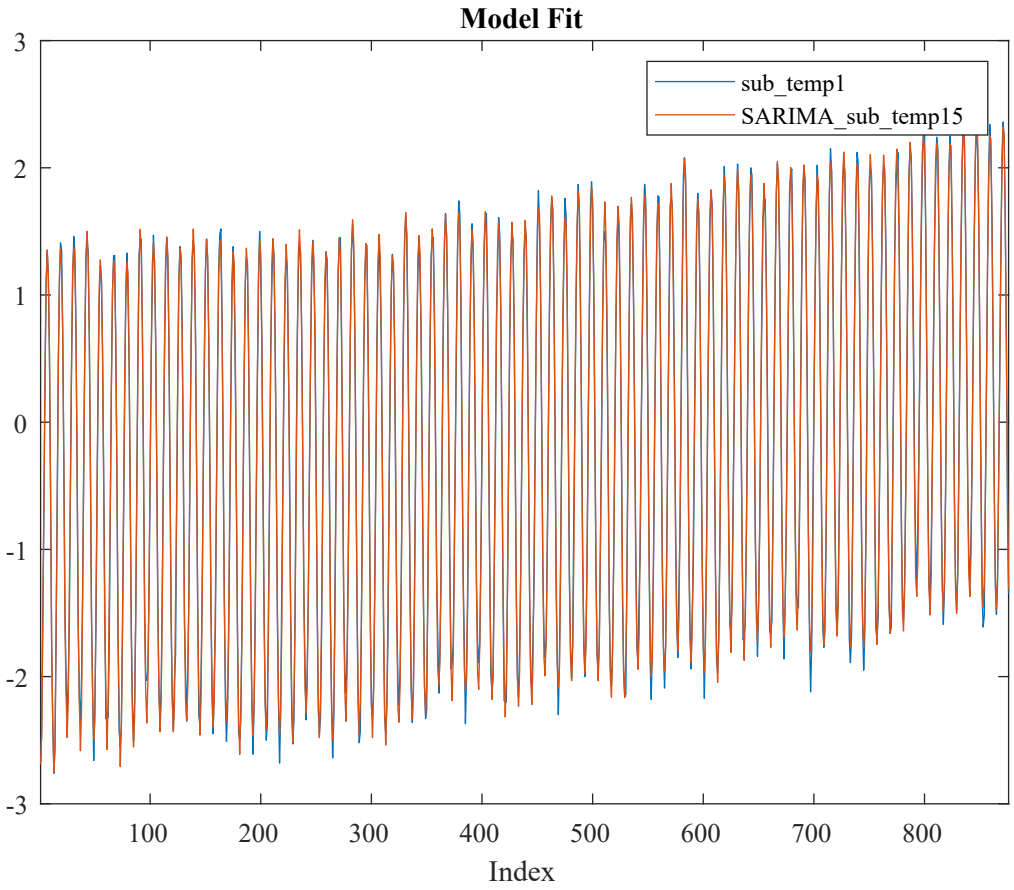
5.1. Model Estimation

Tabel 5.1. Estimation Results

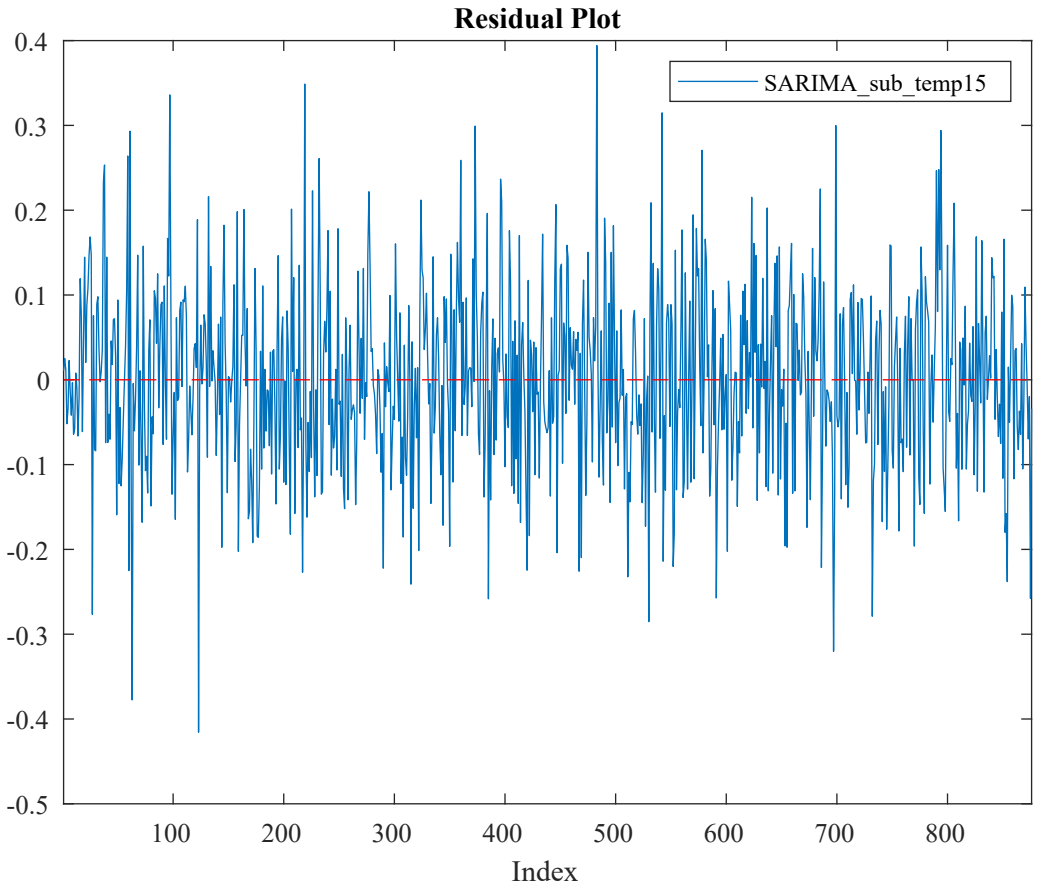
Parameter	Value	Standard Error	t Statistic	P-Value
Constant	1.0299e-05	5.3471e-06	1.9262	0.054083
AR{1}	0.61154	0.26703	2.2901	0.022015
AR{2}	-0.25869	0.15799	-1.6373	0.10156
AR{3}	0.083628	0.16457	0.50816	0.61134
AR{4}	0.23495	0.090026	2.6098	0.0090597
SAR{12}	-0.36132	0.15401	-2.346	0.018974
SAR{24}	-0.014198	0.037698	-0.37663	0.70645
MA{1}	-1.1534	0.26594	-4.3372	1.4433e-05
MA{2}	0.60925	0.27952	2.1796	0.029287
MA{3}	-0.39582	0.17095	-2.3153	0.020594
MA{4}	-0.060013	0.1255	-0.47821	0.6325
SMA{12}	-0.5863	0.15938	-3.6785	0.00023459
SMA{24}	-0.25516	0.14016	-1.8205	0.068685
Variance	0.011398	0.00050428	22.602	4.1381e-113

Tabel 5.2. Goodness of Fit

AIC	-1405.5493
BIC	-1339.3653



Figuur 5.1. Plot the fit of model SARIMA_sub_temp15 time series sub_temp1



Figuur 5.2. Plot of the residuals of model SARIMA_sub_temp15

6. ARIMA(3,1,3) Model Seasonally Integrated with Seasonal AR(24) and MA(24) (Gaussian Distribution) (SARIMA_sub_temp16)

Seasonal ARIMA model of time series sub_temp1 with the following equation:

$$(1-\phi_1 L-\phi_2 L^2-\phi_3 L^3)(1-\Phi_{12}L^{12}-\Phi_{24}L^{24})(1-L)(1-L^{12})y_t = c + (1+\theta_1 L+\theta_2 L^2+\theta_3 L^3)(1+\Theta_{12}L^{12}+\Theta_{24}L^{24})\varepsilon_t$$

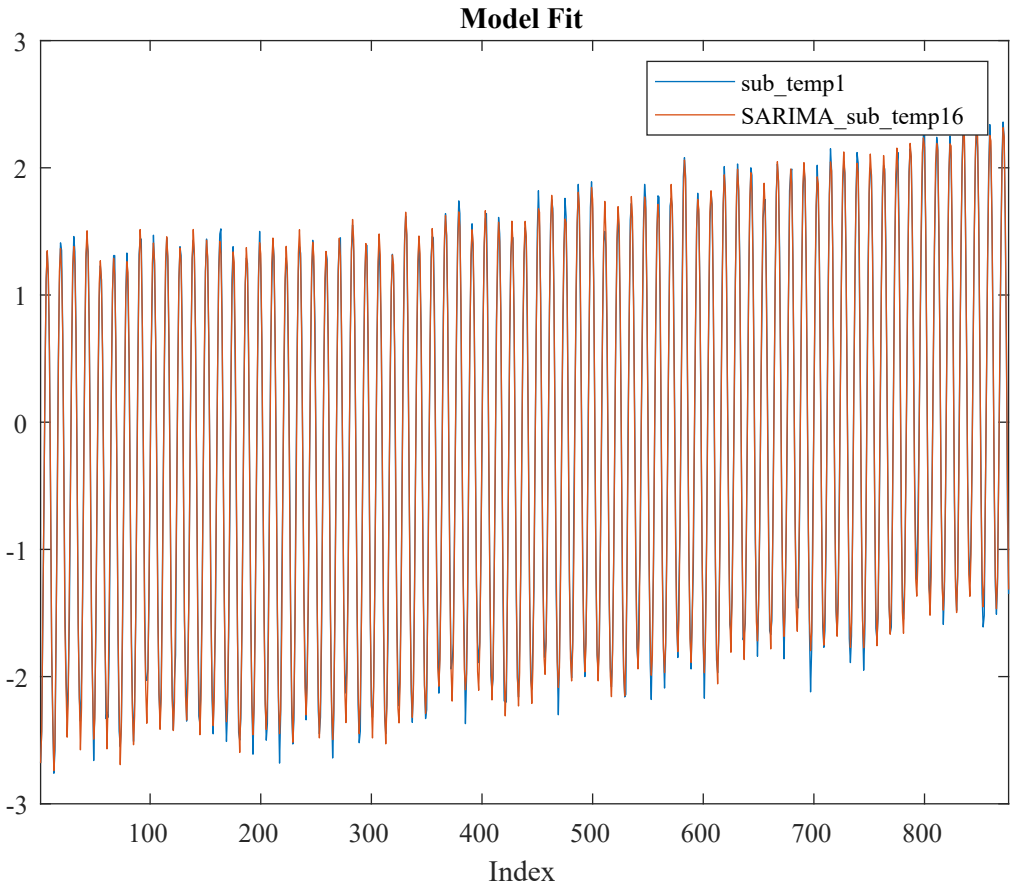
6.1. Model Estimation

Tabel 6.1. Estimation Results

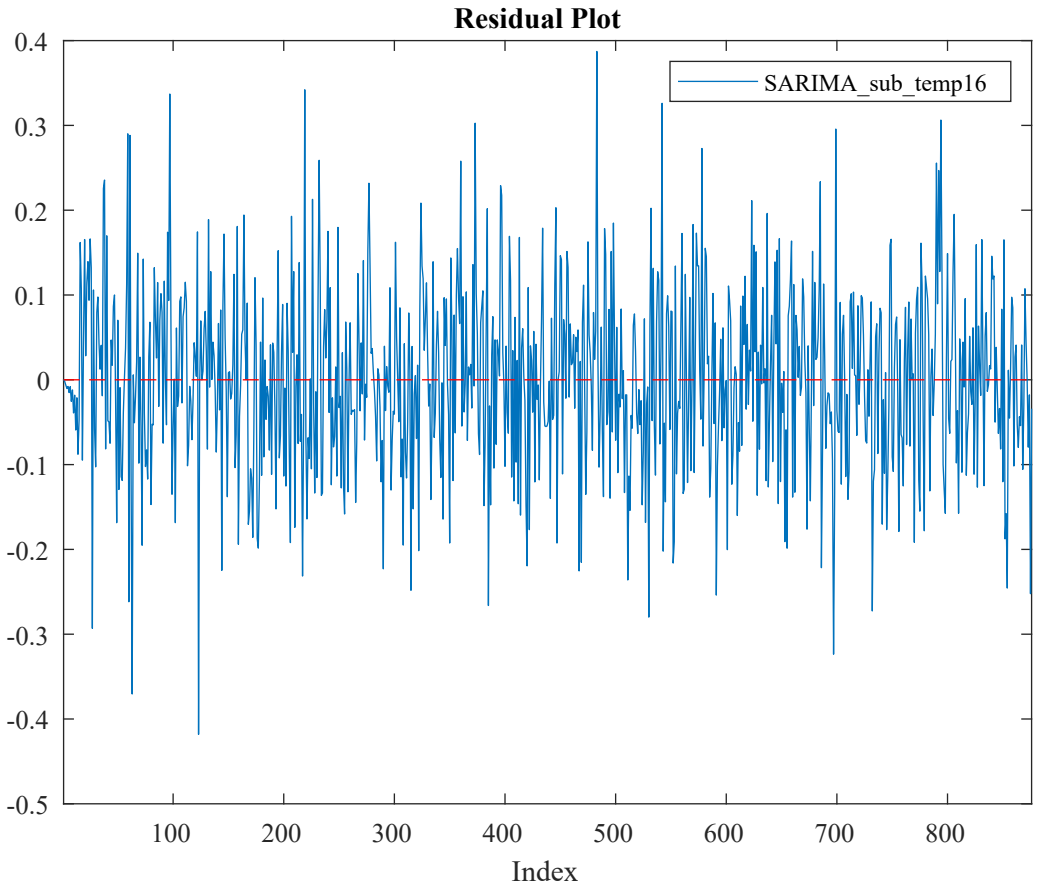
Parameter	Value	Standard Error	t Statistic	P-Value
Constant	6.8426e-06	4.2158e-06	1.6231	0.10457
AR{1}	-0.0011866	0.31179	-0.0038058	0.99696
AR{2}	0.65504	0.14022	4.6717	2.9872e-06
AR{3}	0.038183	0.12689	0.30092	0.76347
SAR{12}	-0.0034508	0.1023	-0.033731	0.97309
SAR{24}	0.012274	0.036241	0.33869	0.73484
MA{1}	-0.55614	0.31179	-1.7837	0.074474
MA{2}	-0.63542	0.29126	-2.1816	0.029139
MA{3}	0.19155	0.11443	1.6739	0.094146
SMA{12}	-0.92118	0.1041	-8.8491	8.8189e-19
SMA{24}	0.043062	0.091704	0.46958	0.63866
Variance	0.011528	0.00051194	22.5177	2.7836e-112

Tabel 6.2. Goodness of Fit

AIC	-1399.6038
BIC	-1342.8603



Figuur 6.1. Plot the fit of model SARIMA_sub_temp16 time series sub_temp1



Figuur 6.2. Plot of the residuals of model SARIMA_sub_temp16

7. ARIMA(2,1,2) Model with Seasonal AR(24) and MA(24) (Gaussian Distribution) (SARIMA_sub_temp17)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1 - \phi_1 L - \phi_2 L^2)(1 - \Phi_{12} L^{12} - \Phi_{24} L^{24})(1 - L) y_t \ = \ c \ + \ (1 + \theta_1 L + \theta_2 L^2)(1 + \Theta_{12} L^{12} + \Theta_{24} L^{24}) \varepsilon_t$

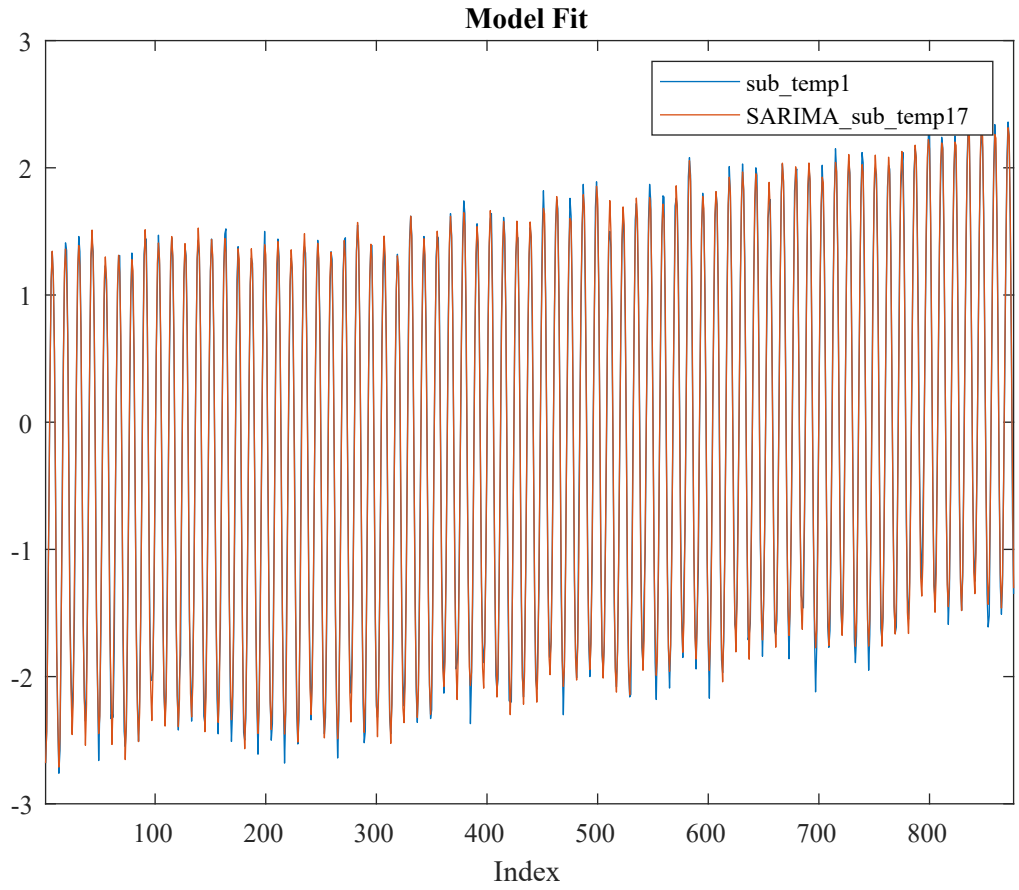
7.1. Model Estimation

Tabel 7.1. Estimation Results

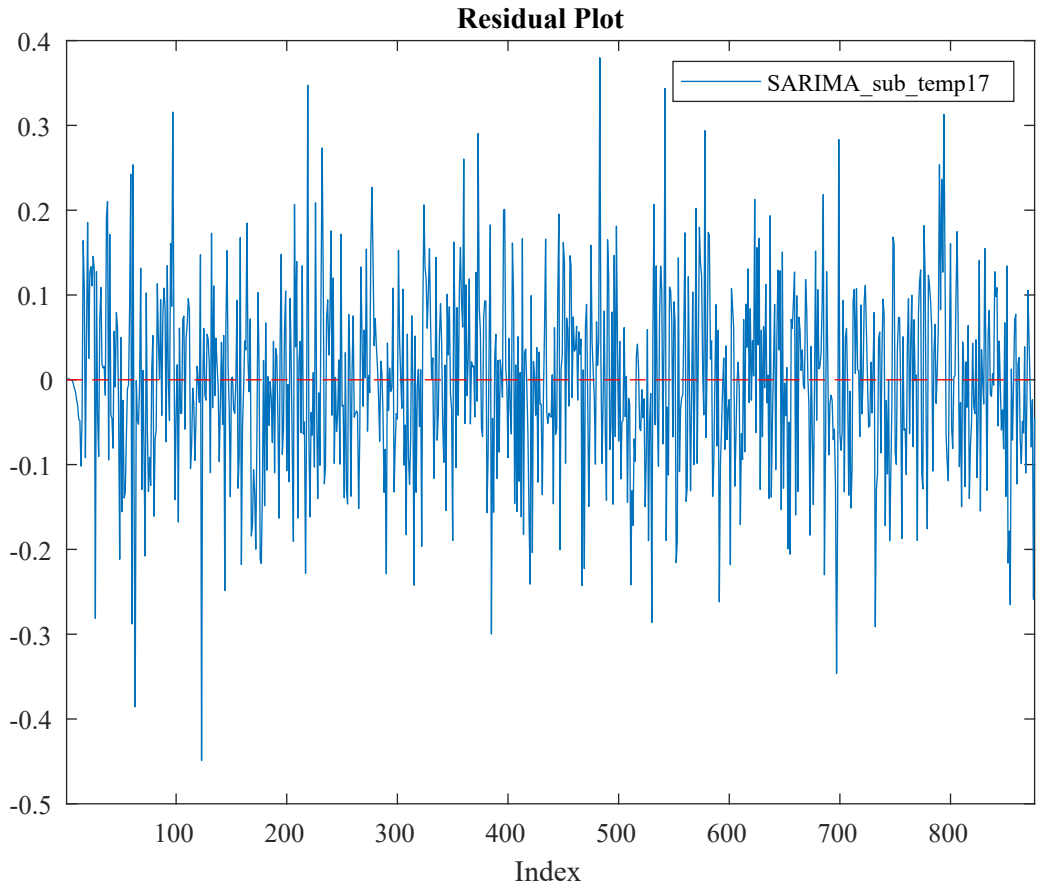
Parameter	Value	Standard Error	t Statistic	P-Value
Constant	1.3471e-05	1.4206e-05	0.94828	0.34299
AR{1}	0.31404	0.14096	2.2279	0.025889
AR{2}	0.30086	0.076859	3.9144	9.0635e-05
SAR{12}	0.99139	0.046285	21.4195	8.7949e-102
SAR{24}	0.0076306	0.046172	0.16527	0.86874
MA{1}	-0.85589	0.14844	-5.7659	8.1243e-09
MA{2}	-0.11843	0.14328	-0.82658	0.40848
SMA{12}	-0.91515	0.057603	-15.8871	7.783e-57
SMA{24}	0.028925	0.051235	0.56456	0.57237
Variance	0.011747	0.00051604	22.7633	1.0585e-114

Tabel 7.2. Goodness of Fit

AIC	-1386.7036
BIC	-1339.263



Figuur 7.1. Plot the fit of model SARIMA_sub_temp17 time series sub_temp1



Figuur 7.2. Plot of the residuals of model SARIMA_sub_temp17

8. ARIMA(1,1,1) Model Seasonally Integrated with Seasonal AR(24) and MA(24) (Gaussian Distribution) (SARIMA_sub_temp18)

Seasonal ARIMA model of time series sub_temp1 with the following equation:
$(1-\phi_1 L)(1-\Phi_{12}L^{12}-\Phi_{24}L^{24})(1-L)(1-L^{12})y_t \;=\; c \;+\; (1+\theta_1 L)(1+\Theta_{12}L^{12}+\Theta_{24}L^{24})\varepsilon_t$

8.1. Model Estimation

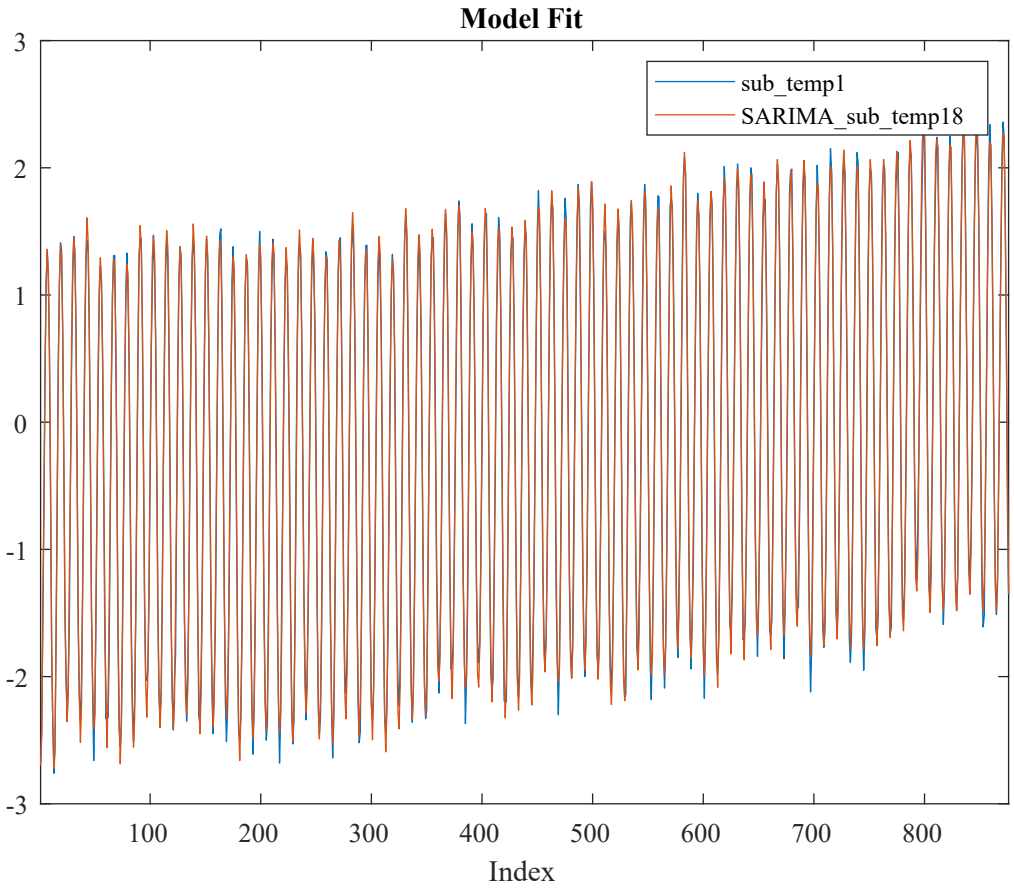
Tabel 8.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Constant	-0.00022951	0.00040205	-0.57086	0.56809
AR{1}	0.078283	0.06352	1.2324	0.21779
SAR{12}	-0.85505	0.14196	-6.0232	1.7103e-09
SAR{24}	-0.059327	0.040135	-1.4782	0.13936
MA{1}	-0.56888	0.052216	-10.8947	1.2221e-27
SMA{12}	-0.11895	0.13717	-0.86721	0.38583
SMA{24}	-0.65633	0.11969	-5.4835	4.171e-08
Variance	0.012149	0.00054692	22.2135	2.5448e-109

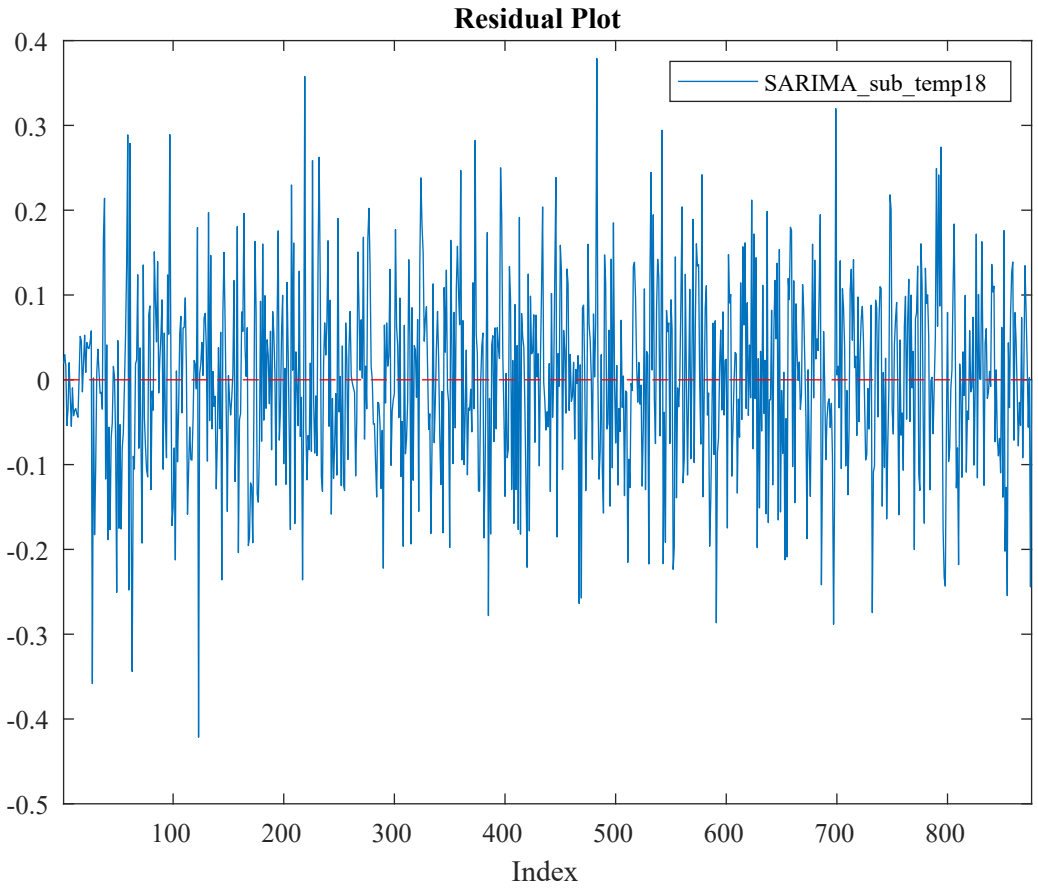
Tabel 8.2. Goodness of Fit

AIC	-1361.6248
BIC	-1323.7766

8. ARIMA(1,1,1) Model Seasonally Integrated with Seasonal AR(24) and MA(24) (Gaussian Distribution) (SARIMA_sub_temp18)



Figuur 8.1. Plot the fit of model SARIMA_sub_temp18 time series sub_temp1



Figuur 8.2. Plot of the residuals of model SARIMA_sub_temp18

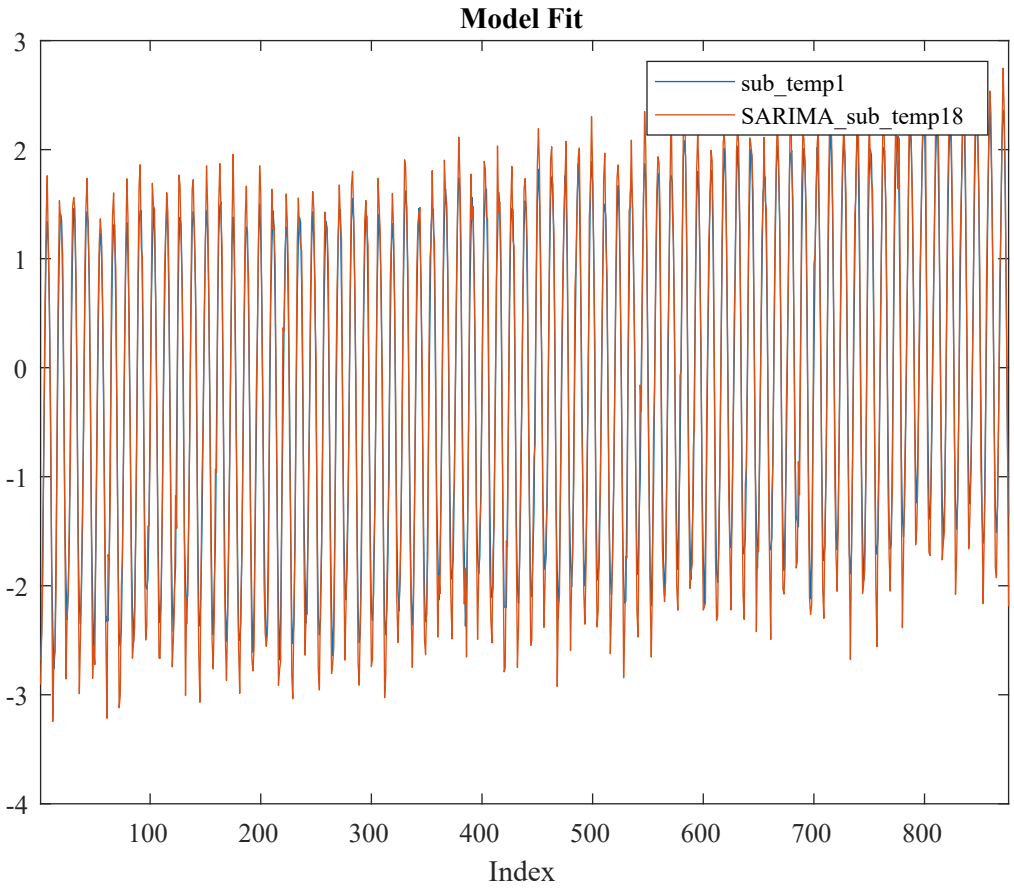
8.2. Model Estimation

Tabel 8.3. Estimation Results

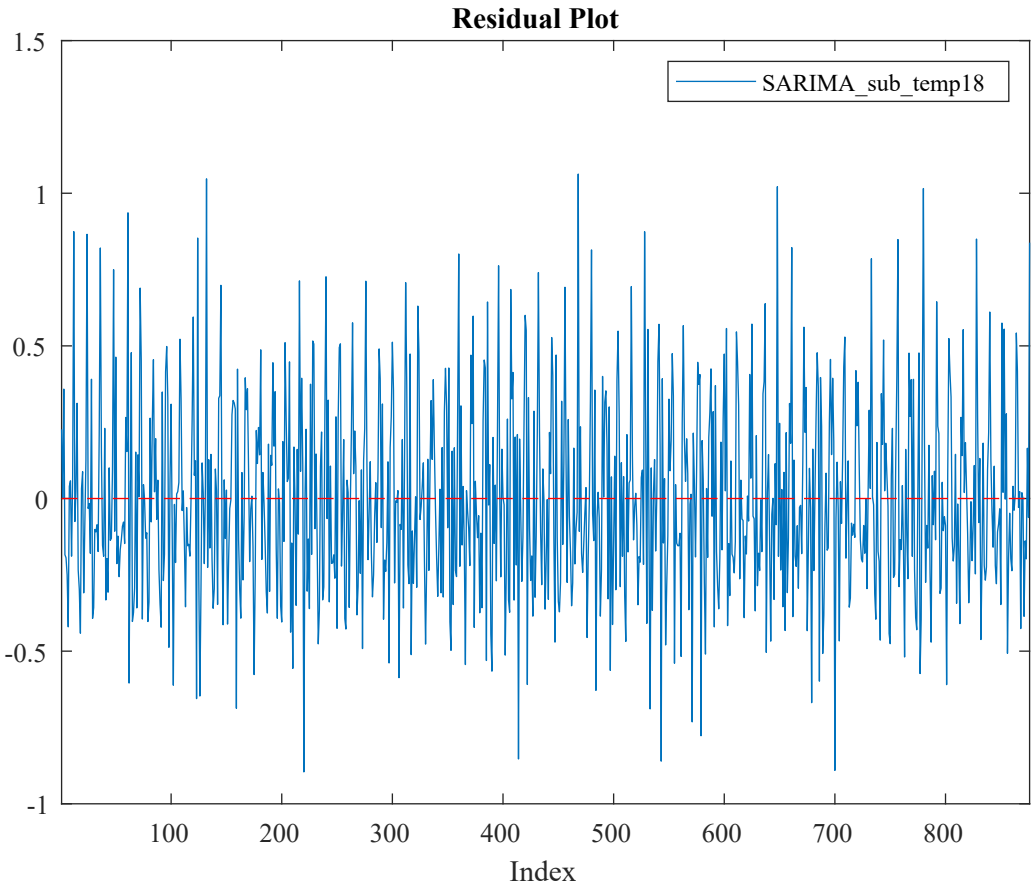
Parameter	Value	Standard Error	t Statistic	P-Value
Constant	0.002033	0.022308	0.091135	0.92739
AR{1}	0.45699	0.0453	10.088	6.2408e-24
SAR{1}	-0.41417	0.071679	-5.7781	7.5529e-09
SAR{2}	0.39811	0.052497	7.5835	3.3645e-14
MA{1}	0.81876	0.10172	8.049	8.3501e-16
SMA{1}	-0.49428	0.048172	-10.2608	1.0582e-24
SMA{2}	0.54645	0.035596	15.3513	3.4719e-53
Variance	0.10307	0.0049842	20.6791	5.3433e-95

Tabel 8.4. Goodness of Fit

AIC	511.3954
BIC	549.5525



Figuur 8.3. Plot the fit of model SARIMA_sub_temp18 time series sub_temp1



Figuur 8.4. Plot of the residuals of model SARIMA_sub_temp18